This document contains Part 3 (pp.100–104) of Chapter 3 of the National Coastal Condition Report III.

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National Coastal Condition Report III

Chapter 3: Northeast Coast Coastal Condition

Part 3 of 3

December 2008

Assessment and Advisory Data

Fish Consumption Advisories

In 2003, 7 of the 10 Northeast Coast states had statewide consumption advisories for fish in coastal waters, placing nearly all of their coastal and estuarine areas under advisory. The states were Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, and Rhode Island. Due in large part to these statewide advisories, an estimated 81% of the coastal miles of the Northeast Coast and 56% of the region's estuarine area was under fish consumption advisories (Figure 3-24) in 2003, with a total of 37 different advisories active for the estuarine and coastal waters of the Northeast Coast during that year. These advisories were in effect for 10 different pollutants (Figure 3-25). Most of the fish advisory listings (97%) were, at least in part, caused by PCBs. Boston Harbor was listed for multiple pollutants (U.S. EPA, 2004b).

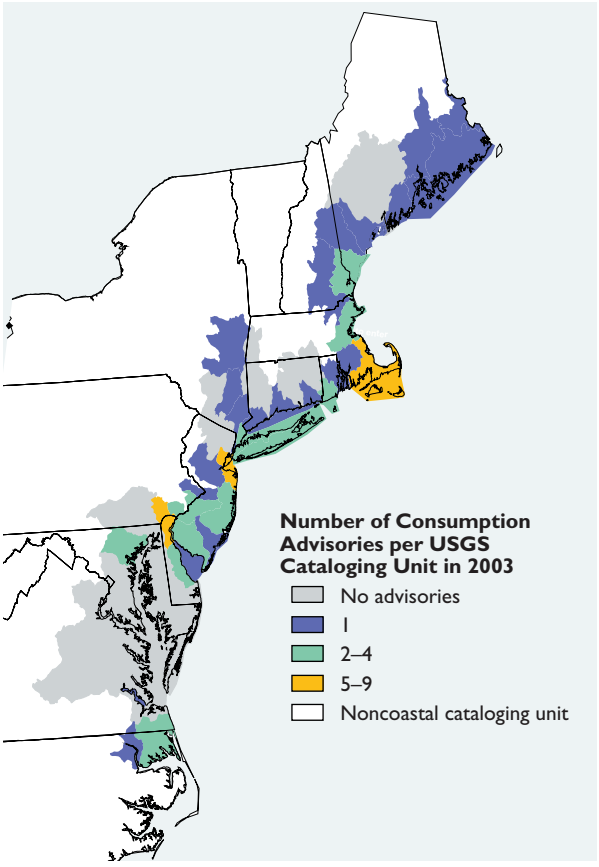


Figure 3-24. The number of fish consumption advisories active in 2003 for the Northeast Coast coastal waters (U.S. EPA, 2004b).

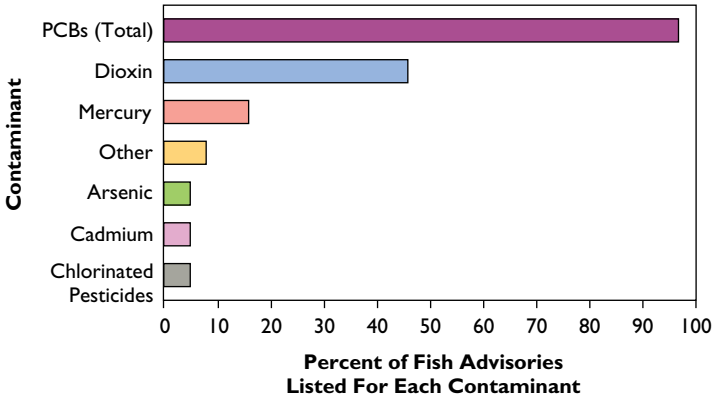


Figure 3-25. Pollutants responsible for fish consumption advisories in Northeast Coast coastal waters. An advisory can be issued for more than one contaminant, so percentages may add up to more than 100 (U.S. EPA, 2004b).

Species and/or groups under fish consumption advisory in 2003 for at least some part of the coastal waters of the Northeast Coast region:

American eel	Rainbow smelt
Atlantic needlefish	Scup
Bivalves	Shark
Bluefish	Shellfish
Blue crab	Smallmouth bass
(whole and hepatopancreas)	Striped bass
Brown bullhead	Swordfish
Common carp	Tautog
Channel catfish	Tilefish
Flounder	Tuna
King mackerel	Walleye
Largemouth bass	White catfish
Lobster (whole and tomalley)	White perch
Northern hogsucker	

Source: U.S. EPA, 2004b

Beach Advisories and Closures

Of the 1,684 Northeast Coast beaches that were reported to EPA in 2003, about 13.4% (226 beaches) were closed or under advisory for some period of time during that year. The states with the highest percentage of beaches with advisories/closures were Connecticut and New York, where 43.3% and 37% beaches, respectively, were closed or under advisory at least once in 2003. Table 3-1 presents the number of beaches monitored and under advisories/closures for each state. Figure 3-26

shows the percentage of monitored beaches in each county with at least one beach advisory or closure in 2003. Maine and Delaware did not report for the 2003 cycle, and Virginia only reported the number of beaches monitored (U.S. EPA, 2006c).

Table 3-1. Number of Beaches Monitored and With Advisories/Closures in 2003 for Northeast Coastal States (U.S. EPA, 2006c)

State	No. of Beaches Monitored	No. of Beaches with Advisories/ Closures	Percentage of Beaches Affected by Advisories/ Closures
Maine	NR	NR	NR
New Hampshire	12	1	8.3
Massachusetts	736	73	9.9
Rhode Island	208	19	9.1
Connecticut	67	29	43.3
New York	211	78	37
New Jersey	324	24	7.4
Delaware	NR	NR	NR
Maryland	88	2	2.3
Virginia	40	NR	NR
TOTAL	**1,686**	**226**	**13.4**

NR = Not Reported

The primary reasons for beach advisories and closures implemented at Northeast Coast beaches were elevated bacteria levels or preemptive closures associated with rainfall events or sewage-related problems (Figure 3-27). Most beaches had multiple sources of waterborne bacteria that resulted in advisories or closures. Figure 3-28 shows stormwater runoff and sanitary sewer overflows were most frequently identified as sources, and unknown sources accounted for 45% of the responses (U.S. EPA, 2006c).

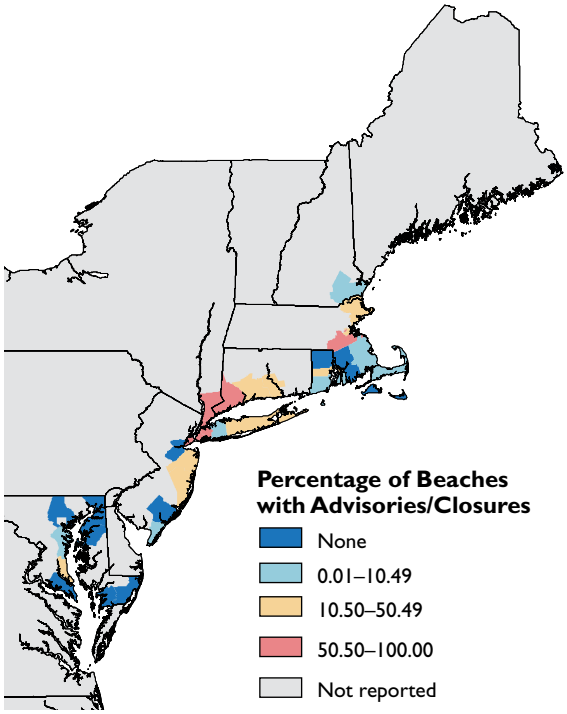


Figure 3-26. Percentage of monitored beaches with advisories or closures, by county, for the Northeast Coast region (U.S. EPA, 2006c).

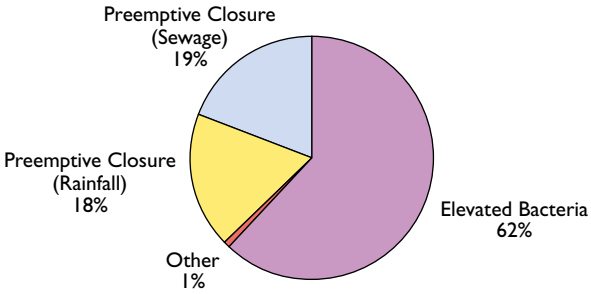


Figure 3-27. Reasons for beach advisories or closures in the Northeast Coast region (U.S. EPA, 2006c).

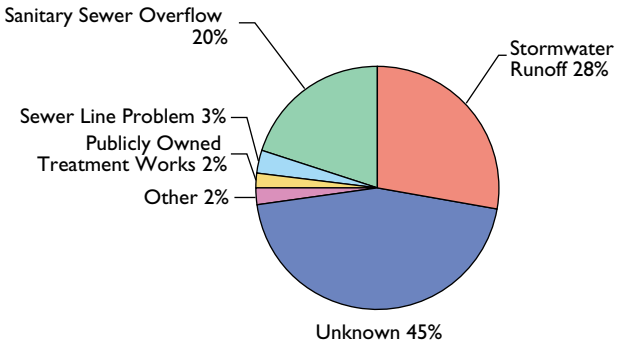


Figure 3-28. Sources of contamination resulting in beach advisories or closures for the Northeast Coast region (U.S. EPA, 2006c).

Highlight

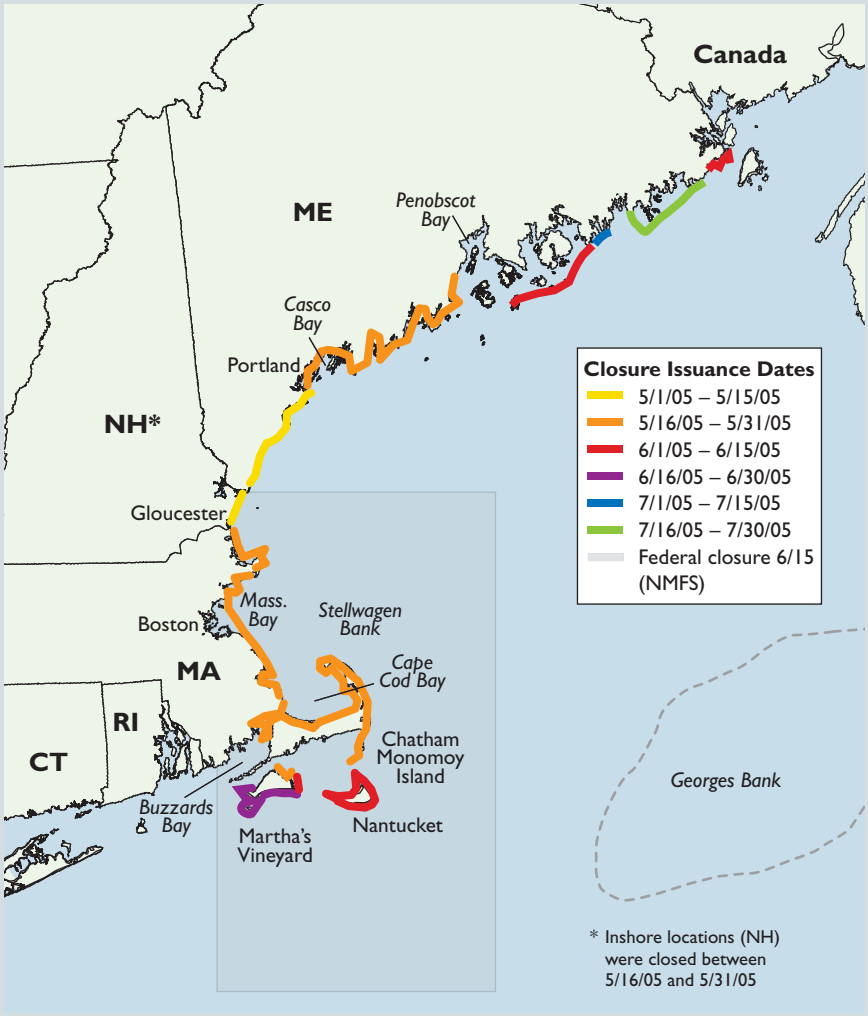
Spring 2005 Brings the Most Harmful Algal Bloom to New England in over Three Decades

Alexandrium fundyense is a naturally occurring algal species that periodically forms HABs in the Gulf of Maine. This algal species also produces potent neurotoxins that can accumulate in filter-feeding shellfish. When humans or other higher trophic-level organisms, such as marine mammals, consume shellfish contaminated with the neurotoxins, severe illness or death can result due to a syndrome called paralytic shellfish poisoning (PSP). In most years, normal wind and water current patterns prevent bloom transport to southern New England's nearshore waters; however, in the spring of 2005, the most severe bloom of this toxic dinoflagellate (type of algae) occurred since 1972 and spread from Maine to Massachusetts, reaching as far south as Martha's Vineyard, MA. This exceptionally expansive bloom may have been a result of elevated rainfall and snowmelt in the spring, followed by two unusually late nor'easters in May. Scientists hypothesize that strong winds pushed *Alexandrium* blooms down the coast, while nutrients supplied by increased runoff fueled their growth (Anderson et al., 2005; NOAA, 2007j).

States in the Northeast Coast region maintain rigorous shellfish monitoring programs to protect humans from PSP. During the 2005 bloom event, the findings of these programs resulted in extensive—and in some locations unprecedented—closures of shellfish harvesting areas (see map). State closures along the New England coast began as early as mid-May, disrupting shellfish sales during the busiest period of the tourist season. In addition to the state closures, NOAA instituted a closure of approximately 15,000 mi^2 of federal waters at the request of the U.S. Food and Drug Administration (FDA) and declared a commercial fisheries failure, which allowed for the mitigation of financial impacts on commercial shellfishermen in the region (Anderson et al., 2005).

NOAA and the National Science Foundation (NSF), through the interagency Ecology and Oceanography of Harmful Algal Blooms (ECOHAB) Program, have funded a decade of research on *Alexandrium* in the Gulf of Maine to advance understanding of *Alexandrium* bloom ecology. Combined with additional research funded through the Monitoring and Event Response for Harmful Algal Blooms Program, the ECOHAB research has also enhanced event response, forecasting, and mitigation capabilities for coastal managers. For example, new methods based on molecular biology are used for the rapid detection and mapping of *Alexandrium*, providing coastal managers with early warnings of shellfish toxicity (Anderson et al., 2005). These data, combined with oceanographic and meteorological data from ships and moorings, have been used in recently developed, coupled biological and physical models to forecast bloom movement and to understand the factors leading to this unusual event (NOAA, 2007k).

During the bloom event, emergency support from NOAA funded expanded monitoring, assessment, and prediction of the bloom extent and movement. *Alexandrium* abundance data allowed managers to focus toxin sampling efforts on newly exposed areas, as well as on areas that could possibly be reopened for shellfish harvesting. Researchers were also able to collect fish and zooplankton samples for an investigation into the potential relationship between the food-web transfer of toxins and whale mortalities in the region. Organizations involved in the emergency response to this HAB event included the Woods Hole Oceanographic Institution (WHOI), Massachusetts Division of Marine Fisheries, Massachusetts Water Resources Authority (MWRA), University of Massachusetts Dartmouth Center for Coastal Studies in Provincetown, and Cooperative Institute for Climate and Ocean Research. Ancillary data from moorings were provided by the Gulf



Map of shellfish closure areas and area of temporary federal closure of offshore waters with closure issuance dates during the 2005 *Alexandrium fundyense* bloom in Maine, New Hampshire, and Massachusetts (Anderson et al., 2005).

of Maine Ocean Observing System and the USGS's instrumented mooring near the MWRA outfall (NOAA, 2007j).

NOAA awarded additional funds to WHOI to sustain monitoring throughout the bloom period and to support post-bloom research. The goals of this research were to improve bloom forecasting, to enhance the efficiency of future monitoring and regulation, and to understand this particular event by "hindcasting" its causative factors. In addition, because future forecasts will be influenced by the "footprint" of dinoflagellate cysts (or seeds) left by this expansive bloom, scientists have developed new cyst maps and will incorporate these into predictive models to aid bloom forecasting in future years. Researchers will also monitor these new areas to see if *Alexandrium* cells originate from the newly deposited cysts (NOAA, 2007j).

Summary

Based on data from NCA, CBP, and NOAA, the overall condition of Northeast Coast coastal waters is rated fair to poor. Problems associated with excess nutrients and low levels of dissolved oxygen are much less prevalent in the Gulf of Maine than in the waters south of Cape Cod. Clean sediments with low levels of chemical contamination, an absence of acute toxicity, and moderate-to-low levels of sediment TOC are found in 76% of the Northeast Coast region's coastal area. Benthic conditions are considered to be poor in 27% of the coastal area, often in the vicinity of high human population density. Fish tissue contamination is also a concern in this region, with 31% of the samples rated poor. When EMAP-VP and NCA data on water clarity, dissolved oxygen sediment toxicity, sediment contaminants, sediment TOC, and benthic communities from 1990–1993 and 2000–2001 were compared, a slightly greater percentage of coastal area was rated poor in the later time interval; however, none of these differences are statistically significant.

NOAA's NMFS manages several fisheries in the Northeast U.S. Continental Shelf LME, including principal demersal fish (e.g, cod, flounder, ocean pout, redfish), pelagic fish (e.g, Atlantic mackerel, Atlantic herring, bluefish, butterfish), and invertebrates (e.g, American lobster, Atlantic sea scallop). Many stocks of principal demersal fish in this LME are considered overfished and currently rebuilding. The abundance indices for mackerel and herring are presently above average, whereas the abundance index for bluefish is near average and for butterfish is below average. The fishing mortality rates of the region's American lobster are substantially above the overfishing level. There have been substantial increases in scallop biomass in the Northeast U.S. Continental Shelf LME since changes were made to the Atlantic scallop fishery management measures in 1994.

Contamination in the coastal waters of the Northeast Coast region has affected human uses of these waters. In 2003, there were 37 fish consumption advisories in effect along the Northeast Coast, most of which (> 90%) were issued for PCB contamination alone or in combination with one or more other contaminants. In addition, approximately 13% of the region's monitored beaches were closed or under advisory for some period of time during 2003. Elevated bacteria levels in the region's coastal waters were primarily responsible for the beach closures and advisories.